bloom.

Grocery and Kitchen

A Study of Visual Representation within the Design Process

Research Thesis

Presented in partial fulfillment of the requirements for graduation with research distinction in Interior Design in the undergraduate colleges of The Ohio State University

Arielle Lucas Villarreal

The Ohio State University
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Project Advisors: Professor Jeffrey Haase and
Professor Rebekah Matheny,
Department of Design

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Initial Research

Franklinton
Currently, the neighborhood of Franklinton has a few nutritional assets such as:

- Franklinton Farms
- Lower Lights Jubilee Market and Cafe
  - Market open M-F 8am-7pm
  - Cafe open M-F 8am-3pm
- The Lunchbox
  - Food truck that delivers meals to food insecure kids in Hilltop, Franklinton, and South End
- Corner stores, food pantries, markets, dollar stores, restaurants, and carryouts
- Mt. Carmel Nutrition Classes

However, there is **no full service supermarket** in Franklinton. This results in food purchased being **more expensive** and of **lower nutritional quality.**

Additionally, the residents of Franklinton experience higher rates of poverty, housing decay, obesity, diet-related diseases, and food insecurity.

40%
of households do not own a vehicle

38%
of households claim to have at least one housing issue, including lack of access to a complete kitchen

19.5%
of those in poverty do not receive nutritional assistance

There are common obstacles to eating a nutritious diet:

Access
If there is not a grocery store within walking distance of home or public transport, access becomes limited

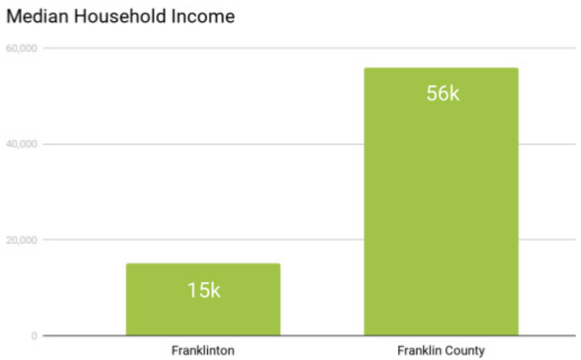
Time
Shift workers, single parents, and people with multiple jobs may not have enough time to maintain a nutritious diet

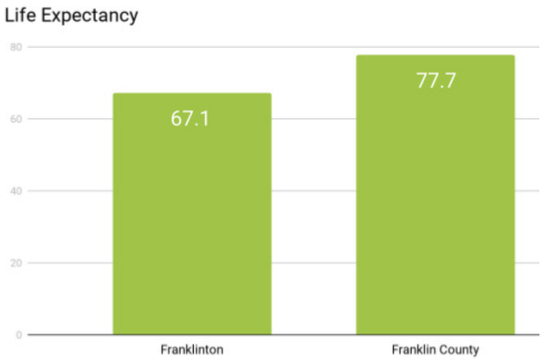
Knowledge
Not having the skills to prepare food or the general knowledge surrounding nutrition

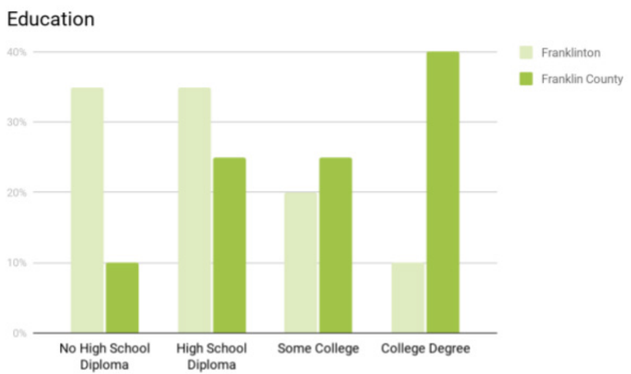
Tools
Preparing meals at home is challenging without a complete kitchen, such as not having a stove or refrigerator

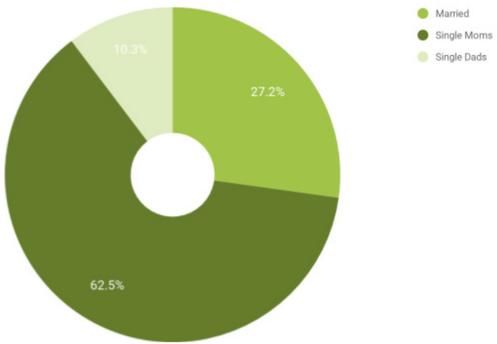
Initial Research

Demographics and Data
The Franklinton community experiences lower household income, life expectancy, and education levels than Franklin county overall. Additionally, nearly two-thirds of Franklinton households are led by single parents.









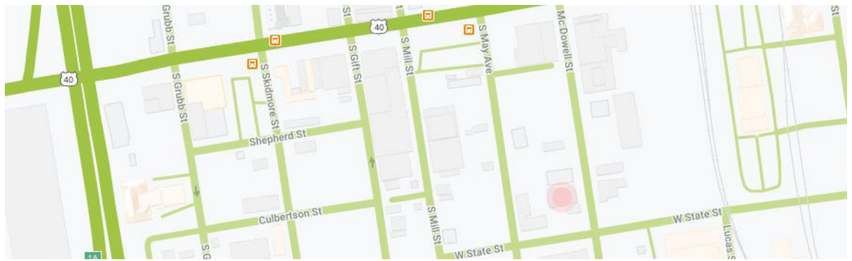
Project Proposal

Creating a multi-service program for Franklinton residents to have access to the supplies and information they need surrounding nutrition, including:

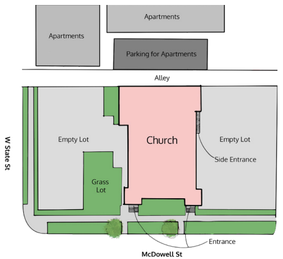
- Cooking and Nutrition Classes: The mini-kitchens used for the classes could also serve as a space for residents for prepare their own meals if they do not have access to a complete kitchen
- Prepared foods for those who do not have the time to cook
- Full-Service Grocery Store/Cafe with locally sourced food
- Food is an integral part of the human experience and can be social. How do we take advantage of the way food can build relationships?

This project would address the lack of access to nutritious food by overcoming barriers such as lack of knowledge and tools, lack of time, and lack of funds. The intention is to empower residents with the facilities, information, and support they need to build a healthier community.

It provides opportunities for both education and improved health and wellness. It could also complement the existing assets such as Franklinton Farms and the various food pantries, creating a more robust set of services.



Franklinton and Site Location



Site Plan

Proposed Location
West Side Spiritualist Church
79 McDowell St
Franklinton, Columbus, Ohio

The project is an adaptive reuse of the West Side Spiritualist Church in Franklinton. Built in 1912, the church survived two great floods during the 20th century.

It has empty lots on its north and south side, perfect for a parking lot and community garden. The building is located about two blocks from a bus stop and has access to sidewalks. There are windows of all sides of the building, letting in a lot of natural light, which would allow for the creation of a vertical farm on the interior of the building.

Exterior

Case Studies

Case Study 1
Sawmill Market, 2020
Islyn Studio
40,000 square feet
Albuquerque, New Mexico

Sawmill Market is a food hall, culinary market, and pays homage to the rich cultural heritage of New Mexico. The space offers art, design, and culinary innovation, featuring boutique owner-operated restaurants, cocktail bars, farm-to-table pantries, tap rooms, test kitchen, pop-up shops, and demo kitchens. This all exists in a former lumber warehouse.

This case study was selected because it features a test kitchen, outdoor space, and a variety of individual food markets. This design is also an adaptive reuse project that focuses on place-making, bringing in characteristics of the surrounding landscape and culture.

Floor Plan

North Section

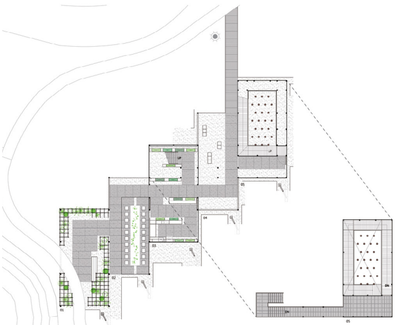
South Section

Case Study 2
Greenhouse as a Home, 2018
BIAS Architecture Firm
1102 square feet
Xinwu District, Taiwan

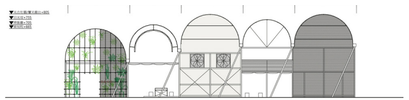
This is an experimental piece of architecture, with human living space intertwined with plants. The space is organized according to five climatic zones:

- Zone 1: Shadowy, humid, and fresh
- Zone 2: Humid and windy
- Zone 3: Climatically stabilized
- Zone 4: Hot and dry
- Zone 5: Hot, humid, and dark

This case study was selected for its community space, vertical farm, meal preparation area, and to generate insights about different ways a greenhouse could be utilized.



Floor Plan



Elevation

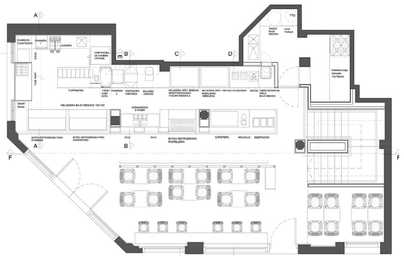
Case Studies

Case Study 3
Tostado Cafe Club
HM.Arquitectos, 2015
591 square feet
Buenos Aires, Argentina

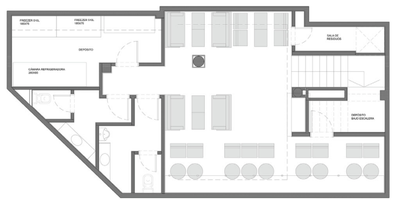
The intention of this project was to recreate the spirit of the traditional Buenos Aires groceries through the use of “the wooden box for groceries.” The boxes are used as accent pieces on the walls, with hollow spaces for antique toasters, coffee makers, and utensils.

The designers used a monochromatic palette, ranging from light to dark grey. Warmth is added through the use of wood tabletops and warm-toned incandescent lights.

This case study was selected for its creative use of materials, food displays, and the distinct spaces in the upper and lower floor.



Main Floor Plan



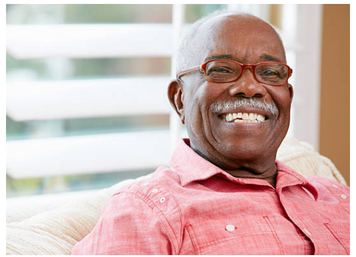
Lower Floor Plan

Schematic Design

Concept
The goal of this space is to empower the residents of Franklinton with the access, tools, and knowledge they need to build a healthier community. It will create opportunities to build relationships within the community, while also providing spaces to develop an understanding and appreciation of the environment. The project will consist of a grocery store that offers prepared meals, meal kits, and cooking and nutrition classes. In addition, an outdoor garden and indoor vertical farm will connect residents to the earth, provide local produce for the community, and teach residents how to grow their own food.

Personas

Julia, 36
• Works at Mt. Carmel as a medical assistant
• Single mom to her daughter
• Busy schedule makes it hard to cook healthy meals
• She would like to buy healthy food that is ready to go and can be reheated in the microwave



Paul, 68
• Born and raised in Franklinton
• Worked in waste management before retiring
• Loves to spend time with his children and grandchildren
• He doesn't have a car, so he does most of his grocery shopping at the local corner stores

Jenna, 17
• High school senior
• Works at a local fast food restaurant
• Keeps herself busy by playing sports throughout the year, including soccer and volleyball
• She has recently fallen in love with cooking and wants to take classes to learn more

Visual Positioning

Materials

Short Program

	Activity	Occupancy	Sq. Ft./Occ.	Total Sq. Ft.
Storage	Storage	15	300	4500
Staff Room	Breaks/Meetings	5	30	150
Office	Management	3	50	150
Restrooms	Restrooms	4	40	240
Produce	Shopping/Product Display	3	60	185
Deli	Shopping/Display/Food Prep	2	60	210
Bakery	Shopping/Display/Food Prep	2	60	210
Refrigerated	Shopping/Product Display	2	60	150
Frozen	Shopping/Product Display	2	60	150
Dry Goods	Shopping/Product Display	5	60	325
Bulk Refill	Low-Waste Dry Goods	5	60	310
Checkout	POS	8	30	250
Community Kitchen	Classes, Kitchens for Residents	8	50	420
Community Space	Classes, Farming, Community Events	45	30	1500
Vertical Farm	Growing Produce	2	300	800
Circulation	Circulation	-	-	3950
Total	Total	111	-	13500

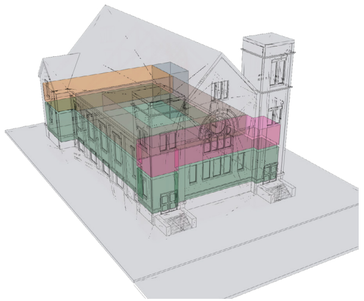
Adjacency Diagram and Criteria Matrix

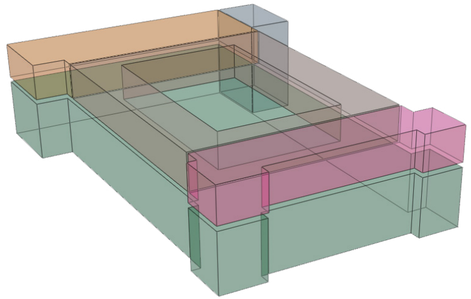
	Square Footage	Daylight	Ac. Priv.
Storage	4500	N	Y
Staff Room	150	M	Y
Office	150	M	Y
Restrooms	240	N	Y
Produce	185	Y	N
Deli	210	Y	N
Bakery	210	Y	N
Refrigerated	150	N	N
Frozen	150	N	N
Dry Goods	325	N	N
Bulk Refill			
Checkout	250	Y	N
Community Kitchen	420	Y	Y
Community Space	1500	Y	N
Vertical Farm	800	Y	N

Schematic Design

Diagrams

Parti Diagram

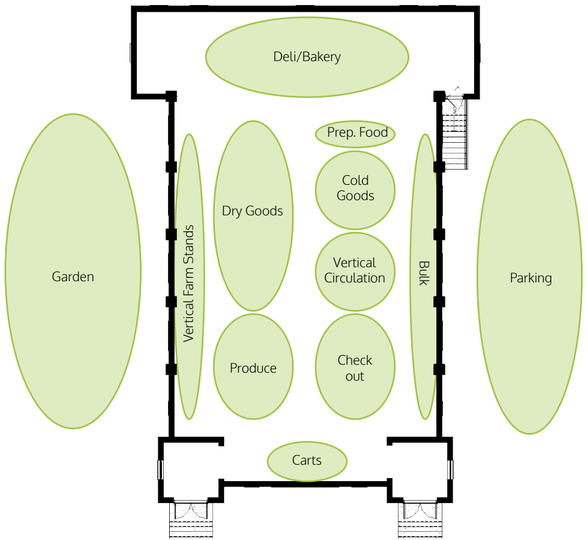




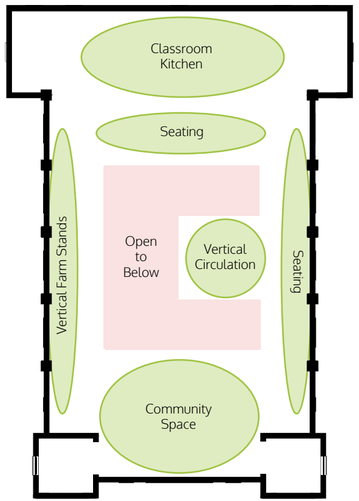
Formit Diagrams

At the beginning of my space-planning process, I created a few simple diagrams to visual different adjacencies. The parti diagram is an abstract representation of the vertical interactions between the floors. The Formit diagrams were used to visualize how the larger spaces (grocery, kitchen, and community space) related to each other and to the building as a whole.

Bubble Diagrams

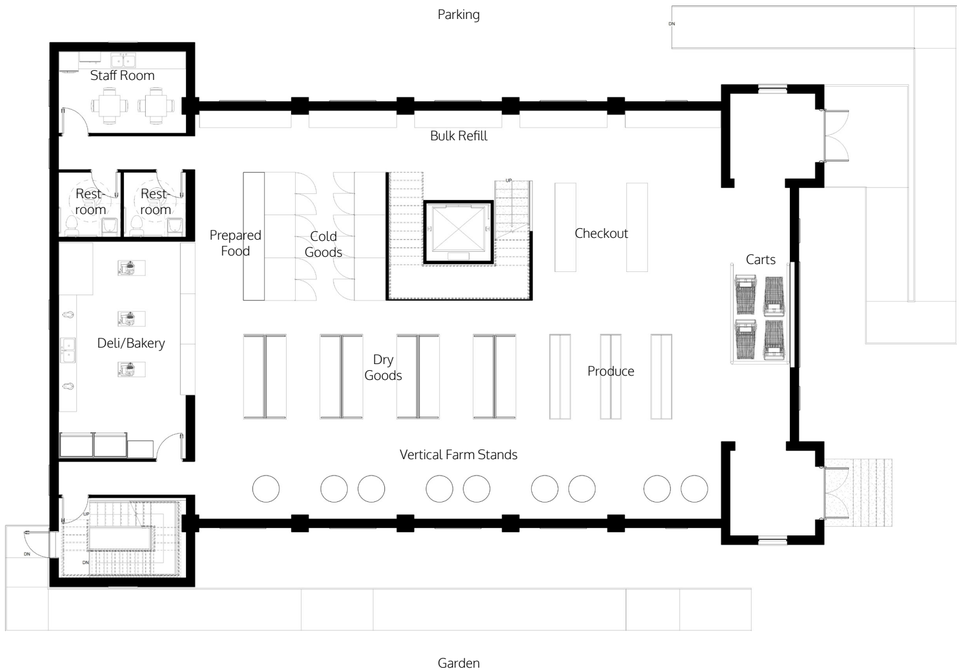


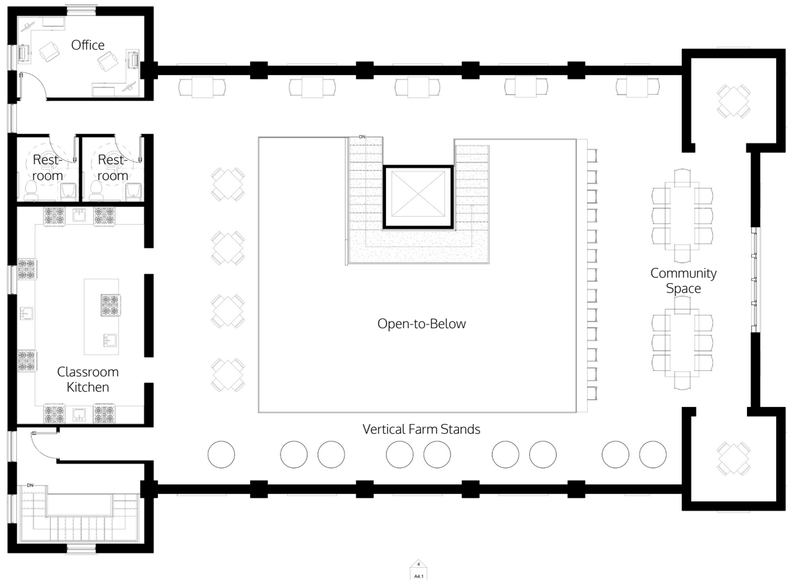
Main Floor



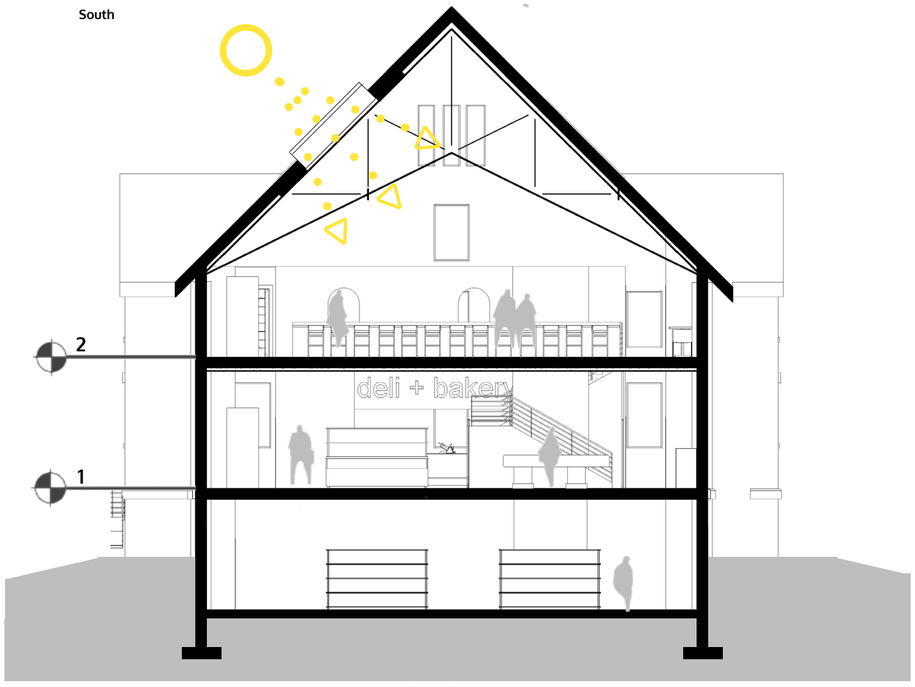
Second Floor

Design Development: Plans

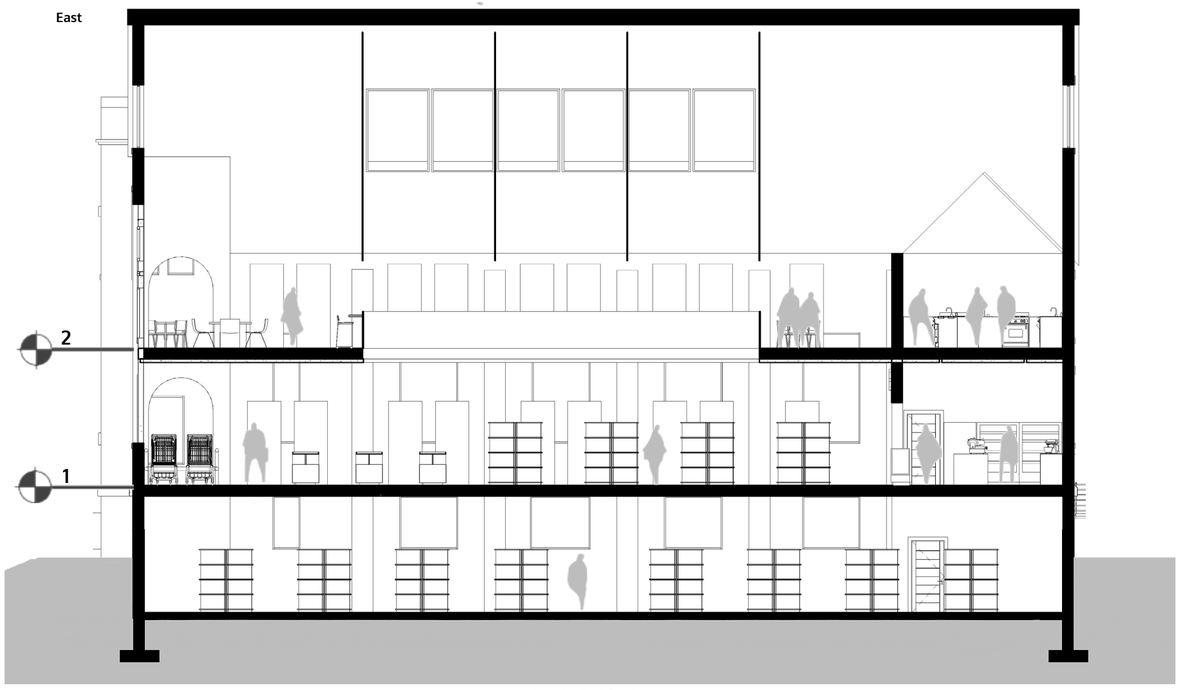




Design Development: Sections



Cross Section



Longitudinal Section

Design Development

Initial Rendering 1
This rendering features the view of the first floor from the point of entry. It depicts the produce and dry goods sections, vertical farm stands, checkout, and vertical circulation.

Initial Reflection
After my initial presentation of my project, I considered the feedback I received and decided to make a few changes.

For this rendering, I planned to remodel the produce stands to include shelving.

First Floor View from entrance

Initial Rendering 2
This rendering shows the second floor community space viewed from the entry to the classroom kitchen. In this view, you can see the large open-to-below space, vertical circulation, seating outside of the kitchen, and vertical farm stands.

Initial Reflection
Based on the feedback I received, I decided to make some changes to the project as a whole. This resulted some material exploration and changes later.

Second Floor View from kitchen

Research Questions

Primary Question:

How can sketching best be utilized within the design process?

Secondary Questions:

- Is there a certain time within the design process that sketching is the best tool?
- Are there specific techniques that make a sketch more legible to communicate ideas more clearly?
- What role does color and materiality play in sketches?
- Is there a certain level of detail required for sketching to communicate effectively?
- Is it possible to include too much detail in a sketch?
- Where does sketching fit in to my own personal design process?

Literature Review: Edge-Based Theory

Cognitive Mechanism related to line drawings and its applications in intelligent process of visual media: a survey. Yongjin Liu, et. al. 2016

This study examined human cognitive processes and their effect on our perception and analysis of visual media. The researchers found that line drawings generate similar neural actions as color photographs. Our cognitive process when viewing imagery moves through three stages: perception (how sensory information is perceived), memory (how to encode and store conceptual prototypes, as well as how to update and consolidate for short and long term memories), and judgment (ranges from how to make a decision to complex problem solving).

The study discussed "edge-based theory," which states that a strong visual data reduction at early stages creates a compact summary of relevant information. An example of this would be turning a photograph into a line drawing. Our analysis and understanding of these images is subject to shape, color, luminance, contrast, orientation, texture, and emotional meaning.

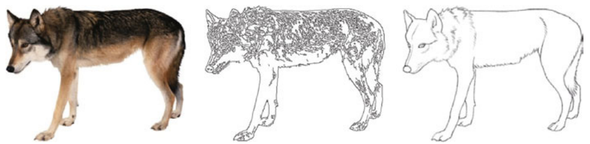
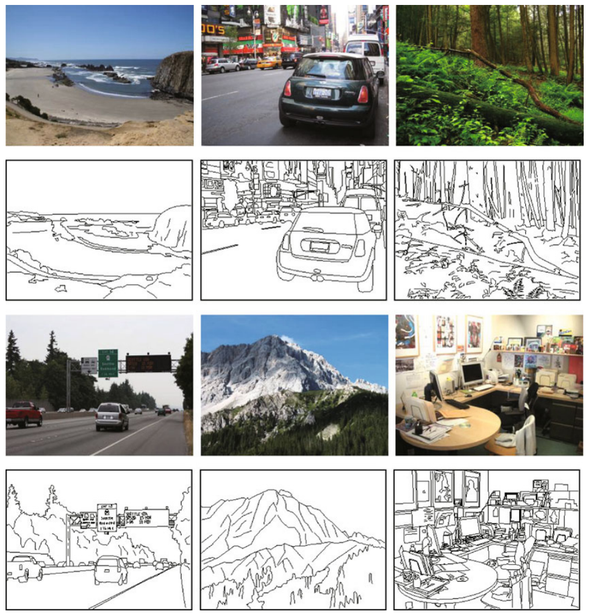


Image of a wolf reduced to line work by an artist

The study argues that "line drawings behave as a conceptual prototype that bridges the gap between low level image feature processing and high level semantic understanding." Natural photographs feature redundancies; line drawings are concise.

In the imagery above and to the right, I made a few observations. In the image of the wolf, there is a clear distinction in readability between the second and third images; there is a "sweet spot" for the amount of included detail. In the various images to the left, I noticed that some are easier to read than others. The images with a significant level of objects become busy and hard to understand.



Different photographs reduced to line work by an artist

Key Takeaways:

- Line drawings provide a concise and compact amount of information, something that is beneficial during the early stages of the design process.
- There is a level of detail that contains enough information to be understandable. Too much visual information makes the image hard to read.
- Images with a significant number of objects or details become hard to read when using the same line weight.

Literature Review: Cognitive Processes in Sketching

Dynamic Design: Cognitive Processes in Design Sketching. Moira R. Dillon 2010

This study states that a, "large part of design cognition is visual, not verbal." It argues that sketches not only serve as a record of ideas, but also as a hotbed of visual cues from which new ideas can be generated (Schon, 1983).

Designers have a dynamic relationship with their sketches. This consists of three types of interaction:

- **Emergence/unexpected discovery:** creation of unanticipated, new ideas in response to visual cues from an existing sketch
- **Reinterpretation:** transformation and adaptation of ideas already expressed in previous sketch
- **Segmentation:** process by which each design move is identified as an individual action

The study identified four types of cognitive actions in the design process:

- **Physical:** material sense; lowest level cognitive actions; writing, marking, depicting
- **Perceptual:** visual sense; visio-spatial cues outlined in sketches; shape, size, composition, texture, etc.
- **Functional:** psychological and psychophysical effects; behavioral effect of depicted elements on people
- **Conceptual:** designers aesthetic preference or subjective evaluation of success or failure of a certain design move; initial goals of design; conceptual elements reflect the designers ability to discover new information from existing information and to break down existing information into subgoals.

In the study, the author references "bottom-up versus top-down" design. Part of this design process centers around the intent of the designer when sketching out ideas. Did the designer intend for an element of their sketch to look that way? Or was the line drawn without intent, as a doodle?

In addition, initial goals and knowledge drive a designer in a top-down fashion. Perceptual features found within the drawing itself along with the drawing process contribute in a bottom-up fashion to the design's development.

The study found that visio-spatial material perceptible in sketches act as cues for functional associations, and visio-spatial cues in sketching can elicit functional ideas and interpretations.

Key Takeaways:

- Sketching serves as a way to continually generate new design ideas, even when revisiting old sketches.
- Material representation within sketches serves as a cue to the functional associations of a design.
- Digital drawings (ie, CAD) contribute more to the latter part of the design process, as in encourages more imagination of form because the next iteration more likely occurs in the designers head than on paper.

Exploration

Material Exploration
I revisited the material selection of my capstone project and explored different material schemes.

These were my first experiments with visual representation, and I noticed myself feeling the need to fill in every single surface with a material, color, or texture. After doing a visual study of other work, and after seeing the work of my classmates, I realized that not everything needs to be 100% completed.

Observations:

- It's okay to leave surfaces blank! Not every decision needs to be made for every sketch or rendering; blank space can draw attention to the details you are exploring.

- Representation can be more abstract. The simple suggestion of a material can still have an impact.

Scheme 1, Round 1

Scheme 1, Round 2

Scheme 2, Round 1

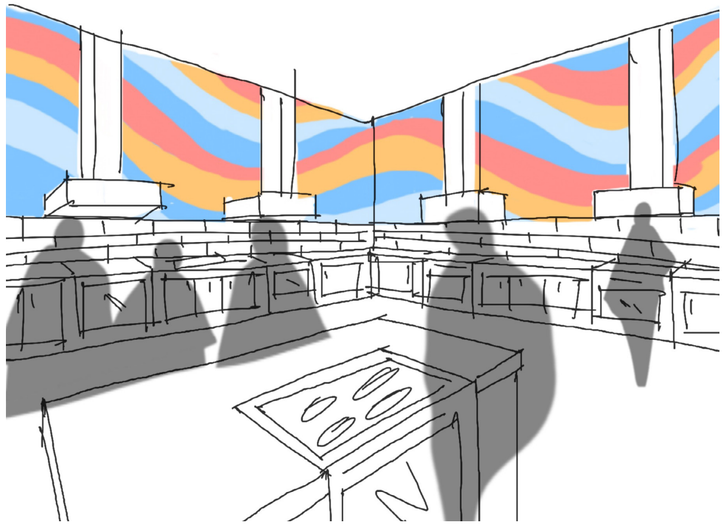
Scheme 2, Round 2

Exploration

Sketch Exploration 1
In this sketch, I revisited the design of my classroom kitchen space. I wanted to explore different materiality via the tile and the use of a wall graphic.

This sketch was completed freehand to see how well it communicated ideas.

My biggest observation from this sketch was that it needed multiple line weights. In its current state, it feels flat and one-dimensional.



Sketch Exploration 2
I wanted to further explore different types of line, so in this sketch, I used a ruler to create clean, crisp lines. I noticed that it was much easier to draw the detail of the tile back splash when working with a ruler.

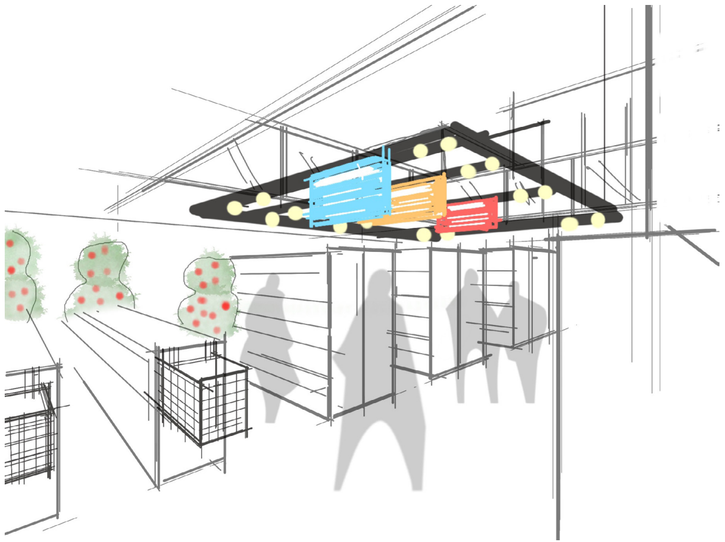
I also used this sketch as a starting point for manipulating line weight. This sketch uses two line weights; one for the overall image, and then another to outline the cabinets and counter tops and to highlight where they meet the wall and floor.

The multiple line weights made a slight difference, but it needs more variety to create a better understanding of depth and separation of objects.

Exploration

Sketch Exploration 3
For this sketch, I continually drew over lines, which created a variance in line weight.

When I initially started the sketching process, I noticed that I had a hard time creating new ideas when sketching on top of the existing images of my design. Because of this, I decided to sketch from memory which helped immensely when generating new ideas.



Observations:

- Line weight matters! It helps to create a sense of depth and distinguishes different shapes from one another, making the image easier to read.

- Color can be used to imply materiality or to create a focal point within the sketch.

- A ruler can be helpful for creating straight lines and working with smaller details, but it isn't always necessary; wavy lines can add character.

Application

Exercise Sketches
After doing some exploration through sketching, I revisited the drawings from Edge-Based Theory and applied the things I learned to those sketches.

First, I recreated the sketches with varying line weights. It quickly became apparent that not only can line weight be used as a tool to imply depth, it can also create a visual hierarchy of information, making the image more legible.

Then, I added a few pops of color to begin to suggest materiality. I think this addition has the biggest impact in the image with the most visual density. Highlighting the desk and the wall suggested a new level of depth within the image and made the clutter almost seem less important.

Observations:

- Adding heavier and lighter line weights to the sketches creates a greater sense of depth and understanding of distance.

- The number of different line weights needed varies based on amount of detail in each image and the implied distance between objects.

- Different line weights make the images with more detail much easier to read.

- Color can be used to suggest materiality or to highlight certain areas that you want to emphasize.

Photograph and original line work from Edge-Based Theory

Traced and Added Color in Morpholio Trace

Application

Final Sketches: Applying Learnings to Senior Capstone Project
After completing the exercise sketches, I applied what I learned to my senior capstone project.

After exporting the original line work from my Revit model, I manipulated the line weights to create a greater sense of depth as was previously seen in the exercise sketches. The next step was to add in materiality and then, finally, to create the final renderings.

Observations:

- In some cases, it is beneficial to use a heavier line weight on the architecture, such as where walls and floors meet. It provides a distinction between structure and furniture.

- It is helpful to create a set of rules for yourself when using multiple line weights. This can be a pen tip size or the thickness of the stroke in Adobe Illustrator. It allows you to create consistency and helps with the illusion of depth.

- Adding color and materiality creates contrast and draws attention to certain areas. Up to this point, the ideas are still very "in process." Once it becomes a photorealistic rendering, the image and designs feel final.

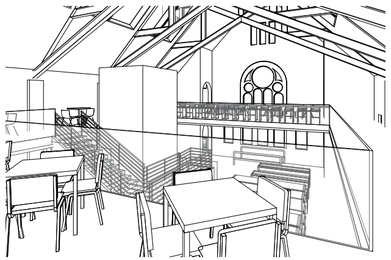
- Explore ideas quickly! The best tool is the fastest tool.

Single Weight Line drawing, First Floor
Exported Revit Line drawing

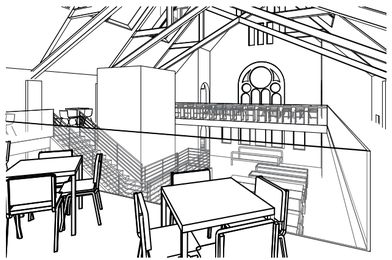
Multiple Weight Line drawing, First Floor
Line weights manipulated in Adobe Illustrator

Multiple line weight drawing with color applied, First Floor
Added materials to Illustrator file in Adobe Photoshop

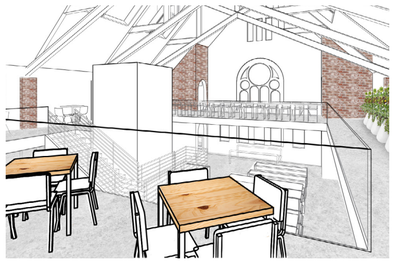
Final Rendering of First Floor View from entrance
Created in Revit and edited in Adobe Photoshop



Single Weight Line drawing, Second Floor
Exported Revit Line drawing



Multiple Weight Line drawing, Second Floor
Line weights manipulated in Adobe Illustrator



Multiple line weight drawing with color applied, Second Floor
Added materials to Illustrator file in Adobe Photoshop

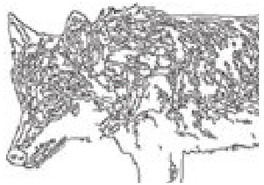
Final Rendering of Second Floor View from kitchen
Created in Revit and edited in Adobe Photoshop

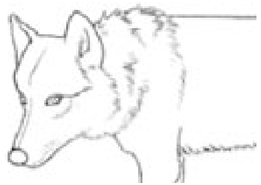
Conclusion

In conclusion, visual representation is a crucial element of the design process. Sketching allows us to explore many ideas quickly and the inclusion of color and materials can help us as designers visualize our decisions. It allows us to communicate our ideas with others, which can result in feedback that can lead to even more new ideas.

The level of detail present in a sketch can vary, and it is something that should be considered for maximum understanding. Edge-Based Theory tells us that a strong data reduction at the beginning creates a compact summary of the most relevant information. As illustrated to the right, the amount of data reduction done is up to the designer to decide, with some decisions being more successful than others. If we keep the factors that affect our understanding of drawings in mind, such as shape, color, orientation, and contrast, the drawing should communicate effectively.

Color and materiality can highlight certain areas of the sketch, but I think their most important role is to help create a functional association and understanding of the design for the viewer. This makes it easier to clearly communicate your design goals and intentions, and can even suggest the sensory experience the user of the design might have.





There are a lot of different tools that can be used for this process. Sketching on paper, digital sketching, the Adobe Suite, drawing apps, and many more all work well. I think the most important factor to consider when deciding which method to use is how quickly you can work in a particular program. The faster you can move through ideas, the more you can use them to generate even more new ideas. For this process, I used 6-8 different tools depending on which part of the process I was in, each serving a different purpose. It is also important to use a tool that you enjoy. It can encourage you to move through more ideations and may even spark new ideas.

On a more personal note, this research has given me an opportunity to enjoy drawing again, and it has helped me to learn about myself, my process, and to discover where sketching fits into my design work.

Moving forward, I think I will integrate sketching and material exploration through the entirety of my process. While I feel that sketching is the most beneficial in the beginning phases of design development, I found that I had gained a lot by revisiting existing ideas in a new way.

Finally, this project provided an opportunity for self-reflection. When I was young, I loved to draw and was creating new images all of the time. By the time I reached high school, however, the focus in art class shifted to photorealism, and it was something that I always struggled with. Around this time, I internalized the idea that if something is not photorealistic, then it is not “good” or worth doing, and I stopped drawing completely. This research project and exploration made me realize that I had carried that with me through design school and applied it to my design process. All of my renderings were photorealistic and I never sketched because I didn’t think my sketches were “good.” I have now learned that a good drawing is one that communicates your ideas, helps you think through problems, and allows you to explore ideas and techniques.

Your drawings don’t need to be perfect. Neither do your renderings, designs, ideas, or anything put to paper. Letting go of the internalized quest for perfection has freed me to spend my energy on exploring new ideas. It has brought joy back to drawing for me, and by extension, made the design process so much more fun and enjoyable.

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